CIGNA MEDICAL COVERAGE POLICY

The following Coverage Policy applies to all plans administered by CIGNA Companies including plans administered by Great-West Healthcare, which is now a part of CIGNA.

Subject **Magnetic Resonance Angiography (MRA)**

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Cardiovascular Magnetic Resonance (CMR)
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INSTRUCTIONS FOR USE

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Coverage Policy

CIGNA covers magnetic resonance angiography (MRA) as medically necessary as an adjunct to other testing for ANY of the following indications:

Head/Neck

- suspected or known vascular pathology (e.g., stroke, subarachnoid hemorrhage, aneurysm, dissection, atherosclerotic disease, arteriovenous malformation [AVM])
- suspected or known intracranial, vertebral, or basilar dissection or for follow-up of berry aneurysm (Note: Coverage for CPT® codes 70546 and 70549 is limited to this indication)
- screening for stroke in an individual with known sickle cell disease or cerebral vasculitis
- screening for intracranial aneurysm for EITHER:
  - a heritable disorder known to be associated with vascular anomalies (e.g., autosomal dominant polycystic kidney disease, Ehlers-Danlos syndrome, fibromuscular dysplasia, or a known aortic coarctation)
  - family history of at least one first-degree relative with a history of intracranial aneurysm
- surveillance of intracranial aneurysm in an individual with EITHER of the following:
  - a known unruptured intracranial aneurysm
  - an intracranial aneurysm previously treated with endovascular coiling or neurosurgical clipping

Chest/Thorax

- suspected or known vascular pathology (e.g., aortic dissection or aneurysm, AVM, pulmonary artery hypertension, subclavian steal syndrome, superior vena cava syndrome, thoracic outlet syndrome, pulmonary sequestration, vascular rings, and conditions associated with thoracic aortic abnormalities [Loeys-Dietz syndrome, Marfan syndrome, Turner syndrome, Takayasu's disease])
- suspected or known pulmonary embolism if ventilation/perfusion (VQ) scanning, computed tomography (CT) or computed tomography angiography (CTA) is not available, contraindicated or inconclusive

Abdomen

- suspected or known vascular pathology (e.g., abdominal aortic aneurysm or dissection, renovascular hypertension)

Extremities

- suspected or known peripheral arterial disease

Cardiac

- pre- or post-intervention/treatment assessment of congenital heart disease or acquired anomaly when the aorta or pulmonary artery needs to be visualized beyond the root (e.g., patent ductus arteriosus, right-sided aortic arch, aberrant right subclavian artery, anomalous left pulmonary artery)
- suspected or known coronary artery anomalies (i.e., coronary artery that is absent or of anomalous origin) or Kawasaki disease

Other

- diagnostic vascular evaluation when medically necessary conventional x-ray angiography is precluded because of contraindication to iodinated contrast material (i.e., allergy to iodinated contrast material, renal insufficiency, or medical condition that precludes exposure to additional large doses of ionizing radiation [e.g., genetic predisposition or mutation repair disorder])

CIGNA does not cover MRA for any other indication, including but not limited to screening for coronary artery disease (CAD) in an asymptomatic individual, because it is considered experimental, investigational or unproven.

General Background

Magnetic resonance angiography (MRA) is a magnetic resonance imaging (MRI) study of the blood vessels. MRA utilizes MRI technology to detect, diagnose and aid in the treatment of disorders and diseases involving the blood vessels. MRA provides detailed images of blood vessels without using any contrast material, although contrast material (e.g., gadolinium) is often given to provide additional clarity to MRI images. By analyzing the amount of energy released from tissues exposed to a strong magnetic field, MRA provides images of normal and diseased blood vessels as well as visualization and quantification of blood flow through these vessels. MRA is a general term used to describe MRI of vascular structures. The term magnetic resonance venography (MRV) may specifically be used to refer to a vein instead of an artery. Generally, MRA/MRV is not a first-line imaging modality. Commonly, MRA/MRV may be ordered after computed tomography (CT) or MRI scans have failed to resolve outstanding diagnostic and/or treatment planning questions.

Compared to radiographic catheter-based angiography, MRA is noninvasive with no risk of neurologic deficit, circulatory compromise due to vascular injury, or adverse effects of iodinated contrast material. Compared to vascular ultrasound (US), it has higher accuracy, is less operator-dependent, has greater freedom from interference by body habitus, and greater 3-D capability. It is a safer alternative to the patient than computed tomography angiography (CTA), as neither ionizing radiation nor iodinated contrast agents are used.

The American College of Cardiology (ACC) 2010 expert consensus document on cardiovascular magnetic resonance states "MRA techniques exhibit high utility for assessing the carotid arteries, aorta, renal arteries, and peripheral vasculature."

U.S. Food and Drug Administration (FDA)

The FDA regulates MRI systems as Class II devices, and the commonly used systems have been approved via the FDA 510(k) process.

Literature Review

Head and Neck
MRA is a useful modality when head and neck vascular visualization is needed. MRA is performed for suspected or known stroke, intracranial vascular occlusion, subarachnoid hemorrhage (SAH), cerebral aneurysms, arteriovenous malformations (AVM), carotid artery stenosis or occlusion, and carotid artery dissection. MRA may play a role when vascular visualization is needed in medically refractory or diagnostically difficult cases. MRA can also be used to examine the cerebral venous system (MR venography). Use of MRA for screening for stroke is not indicated, except for individuals with known sickle cell or cerebral vasculitis. Commonly, transcranial Doppler ultrasonography is the first-line imaging modality for this specific population subset. The clinical utility of screening for stroke in individuals with sickle cell trait alone, in the absence of known disease, has not been established. The peer-reviewed scientific literature supports the use of MRA/MRV for head and neck vascular imaging in a subset of individuals when used as an adjunct to other imaging (Menke, et al., 2009; Chappell, et al., 2009; Debrey, et al., 2008; Wardlaw, et al., 2006; U-King-Im, et al., 2004; Cosottini, et al., 2003; Nederkoorn, et al., 2003; Seibert, et al., 1998). There is evidence to indicate that MRA of the head or MRA of the neck without contrast material followed by contrast material(s) and further sequences (i.e, CPT® 70546 and 70549 with and without contrast) has clinical utility for a carefully selected subset of individuals when used to rule out intracranial, vertebral, or basilar dissection; or for follow-up of berry aneurysm. The utility of other applications of this type of imaging has not been demonstrated.

American Heart Association and American Stroke Association (AHA/ASA): The AHA/ASA recommendations regarding imaging of acute ischemic stroke (Latchaw, et al., 2009) states that overall, contrast-enhanced (CE) MRA has greater sensitivity and specificity than Doppler ultrasound for detecting most types of extracranial cerebrovascular lesions. It can also noninvasively detect most significant intracranial vasoocclusive lesions. CE-MRA is useful for detecting intracranial aneurysms and extracranial arterial dissections; however, it cannot be used in patients with pacemakers, some metallic implants, and those with allergies to MR contrast agents, and its use is limited in patients with severe claustrophobia.

The AHA/ASA recommendations regarding evaluation of transient ischemic attack (Easton, et al., 2009) state that initial assessment of the extracranial vasculature may involve any of the following: carotid ultrasound/transcranial Doppler, MR angiography, or CT angiography, depending on local availability and expertise, and characteristics of the patient (Class IIa).
See Appendix B for American College of Cardiology/American Heart Association [ACC/AHA] Definitions of Classification used.

European Federation of Neurological Societies (EFNS): The EFNS Guideline on neuroimaging in acute stroke states the following regarding MRA:

Imaging of the Brain
In conjunction with MRI and MRA, perfusion and diffusion MR are very helpful for the evaluation of patients with acute ischemic stroke (Class I). Perfusion and diffusion MR are helpful to select patients for intravenous thrombolysis beyond 3 hour (Class II). MRI with MRA is the method recommended for the diagnosis and follow-up of arterial dissection (Class II).

Imaging of Extracranial Vessels
MRA has slightly higher sensitivity and specificity than US to determine carotid stenosis and occlusion, but other factors, such as availability, may render one procedure more useful than the other (Class II).

Imaging of Intracranial Vessels
MRA and CTA are very useful for the diagnosis of intracranial stenosis and cerebral aneurysms > 5 mm (Class II). MRA is the recommended technique for screening cerebral aneurysms in individuals with a history of aneurysms or SAH in a first-degree relative (Class II, level B). MRI with MRA is recommended for the diagnosis and follow-up of cerebral venous thrombosis (CVT) (Class II).

Evidence Classification Scheme for a Diagnostic Measure:

Class I: A prospective study in a broad spectrum of persons with the suspected condition, using a "gold standard" for case definition, where the test is applied in a blinded evaluation, and enabling the assessment of appropriate tests of diagnostic accuracy
Class II: A prospective study of a narrow spectrum of persons with the suspected condition, or a well-designed retrospective study of a broad spectrum of persons with an established condition (by "gold standard") compared to a broad spectrum of controls, where test is applied in a blinded evaluation, and enabling the assessment of appropriate tests of diagnostic accuracy
Class III: Evidence provided by a retrospective study where either persons with the established condition or controls are of a narrow spectrum, and where test is applied in a blinded evaluation
Class IV: Any design where test is not applied in blinded evaluation OR evidence provided by expert opinion alone or in descriptive case series (without controls) (Masdeu, et al., 2006)

Screening for and Surveillance of Intracranial Aneurysms
Evidence in the peer-reviewed scientific literature supports screening for and surveillance of intracranial aneurysms with CTA or MRA for certain population subsets. Specifically, the literature supports screening for individuals with heritable disorders known to be associated with vascular anomalies (e.g., autosomal dominant polycystic kidney disease, Ehlers-Danlos syndrome, fibromuscular dysplasia, a known aortic coarctation). Additionally the literature supports screening in individuals with at least one first-degree relative with a history of intracranial aneurysm. Study results vary, but generally, screening becomes even more critical if the individual has greater than one first-degree relative with a history of intracranial aneurysm (i.e., familial intracranial aneurysm) and if that individual also has a personal history of hypertension, smoking, or takes oral contraceptives. Because the age at which familial aneurysms arise tends to cluster, screening should start at the beginning of the decade in which the index subarachnoid hemorrhage occurred in the family member. The literature supports surveillance of intracranial aneurysms with CTA or MRA in individuals with known unruptured intracranial aneurysm or previously treated intracranial aneurysms. The literature varies in recommended frequency of screening or surveillance (e.g., every five to ten years) but does recommend annually imaging for an individual previously treated with endovascular coiling (Broderick, et al., 2009; Woo, et al, 2009; Bor, et al., 2008; Brown, et al., 2008; Wermer, et al., 2008; Suarez, et al., 2006; Wermer, et al., 2005a; Wermer, et al., 2005b; Vega, et al., 2002; Johnston, et al., 2002; Magnetic Resonance Angiography in Relatives of Patients with Subarachnoid Hemorrhage Study Group [The], 1999).

American Heart Association (AHA): The AHA Guidelines for the Management of Aneurysmal Subarachnoid Hemorrhage (SAH) (Bederson, et al. 2009) states “Screening of certain high-risk populations for unruptured aneurysms is of uncertain value (Class IIb); advances in noninvasive imaging may be used for screening, but catheter angiography remains the gold standard when it is clinically imperative to know if an aneurysm exists”. See Appendix B for ACC/AHA Definitions of Classification used.

Thoracic and Abdominal
MRA identifies relevant vascular anatomy for evaluation of aneurysms, stenosis, vascular malformations, dissections and other congenital or acquired vascular abnormalities (American College of Radiology, 2006). MRA is an effective diagnostic and pre- and post-surgical tool for vascular conditions of the thorax, abdomen and pelvis (Garovic, et al., 2010; Gluecker, et al., 2008; Goldstein, et al., 2007; Vasbinder, et al., 2004; Hacklander, et al., 2004; Tan, et al., 2002). The appearance of nephrogenic systemic fibrosis (i.e., nephrogenic fibrosing dermopathy) has been reported to be associated with the use of gadolinium-based contrast agents. Although the risk associated with gadolinium may differ by contrast agent and dialysis modality, use of gadolinium-based contrast agents should be avoided when possible in patients with renal failure (Kallen, et al., 2008; Broome, et al., 2007; Marckmann, et al., 2006).

American College of Cardiology/American Heart Association (ACC/AHA): Guidelines for the Diagnosis and Management of Patients With Thoracic Aortic Disease states “for the thoracic aorta, contrast-enhanced MR angiography is usually performed with ECG gating. Although this increases acquisition time, it provides motion-free images of the aortic root and ascending aorta. For patients without a contraindication to receiving a gadolinium-based contrast agent, contrast-enhanced MR angiography is often the sequence of choice from which most of the diagnostic information is obtained” (Hiratzka, et al., 2010).

Peripheral Arterial Disease
MRA/MRV of the lower extremities is an established diagnostic and surgical planning imaging procedure in the treatment of peripheral vascular disease. It is useful to diagnose anatomic location and degree of stenosis and

in selecting patients with lower extremity disease as candidates for endovascular intervention. MRA of the extremities is usually performed with gadolinium enhancement (ICSI, 2010; Ouwendijk, et al., 2008; Szucs-Farkas, et al., 2008; Schaefer, et al., 2007; de Vries, et al., 2006; Ouwendijk, et al., 2005).

The Health Technology Assessment (HTA) Program, part of the United Kingdom (UK) National Institute for Health Research (NIHR), published a Health Technology Assessment (Collins, et al., 2007). Collins et al. conducted a systematic review of duplex ultrasound, MRA and CTA for the diagnosis and assessment of symptomatic, lower limb PAD. Collins et al. concluded that CEMRA has the best overall diagnostic accuracy of the three index tests evaluated. Where available, CE MRA may be a viable alternative to contrast angiography. Goodacre et al. (2006) conducted a health technology assessment for the UK National Health Service. A total of 14 articles were included in the meta-analysis. Most studies compared MR venography with contrast venography in patients with suspected DVT. MR venography pooled estimate of sensitivity was 92%, and the pooled estimate of specificity was 95%.

American College of Cardiology/American Heart Association (ACC/AHA): ACC/AHA Practice Guidelines for the Management of Patients with Peripheral Arterial Disease (Lower Extremity, Renal, Mesenteric, and Abdominal Aortic) (Hirsch, et al., 2006) include the following recommendations specific to MRA:

Lower Extremity PAD:

- MRA of the extremities is useful to diagnose anatomic location and degree of stenosis of PAD (Class I)
- MRA of the extremities should be performed with gadolinium enhancement (Class I)
- MRA of the extremities is useful in selecting patients with lower extremity PAD as candidates for endovascular intervention (Class I)
- MRA of the extremities may be considered to select patients with lower extremity PAD as candidates for surgical bypass and to select the sites of surgical anastomosis (Class IIb)
- MRA of the extremities may be considered for postrevascularization (endovascular and surgical bypass) surveillance in patients with lower extremity PAD (Class IIb)
- CTA of the extremities may be considered as a substitute for MRA for those patients with contraindications to MRA (Class IIb)
- Noninvasive imaging modalities, including MRA, CTA, and color flow duplex imaging, may be used in advance of invasive imaging to develop an individualized diagnostic strategic plan, including assistance in selection of access sites, identification of significant lesions, and determination of the need for invasive evaluation (Class IIa)

Renal Arterial Disease:

- Duplex ultrasonography, CTA (in individuals with normal renal function), and MRA are recommended as screening tests to establish the diagnosis of renal artery stenosis (Class I)
- When the clinical index of suspicion is high and the results of noninvasive tests are inconclusive, catheter angiography is recommended as a diagnostic test to establish the diagnosis of renal artery stenosis (Class I)

Mesenteric Arterial Disease:

- Duplex ultrasound, CTA, and gadolinium-enhanced MRA are useful initial tests for supporting the clinical diagnosis of chronic intestinal ischemia (Class I)

See Appendix B for ACC/AHA Definitions of Classification used.

Cardiac

MRA for the detection of coronary artery disease (CAD) in asymptomatic or symptomatic individuals is not supported in the scientific literature. As compared to conventional angiography, the accuracy of MRA for detecting significant coronary artery disease is 87% (Yang, et al., 2009; Sakuma, et al., 2006). Specifically, the American College of Cardiology (ACC) states that MRA is inappropriate for the detection of CAD in the symptomatic patient, with the exception of when coronary anomalies are suspected (Hendel, et al., 2006). The American Heart Association (AHA) notes that “anomalous coronary artery evaluation can be performed by either CTA or MRA; radiation-protection concerns indicate that MRA is preferred when it is available” (Bluemke, et al., 2008). Additionally, MRA can aid in the evaluation of coronary artery aneurysms in Kawasaki disease (Greil, et al., 2002).

MRA can provide additional information to MRI such as cardiac hemodynamics and vascular anatomy and is especially helpful when the aorta or pulmonary artery need to be visualized beyond the root (e.g., patent ductus arteriosus, right-sided aortic arch, aberrant right subclavian artery, anomalous left pulmonary artery) (Fenchel, et al., 2007; Juraszek, et al., 2006; Moll Bernardes, et al., 2006; Prasad, et al., 2004; Shors, et al., 2003; Finn, et al., 2002).

The Medicare Coverage Advisory Commission published a technology assessment on noninvasive imaging for CAD (Patel, et al., 2007). A review of the available scientific evidence through 2005 was conducted for direct noninvasive imaging tests for CAD. Specifically, a search for 16 (and higher) CTA and 1.5 Tesla MRA to evaluate for stenosis in native coronary arteries resulted in 123 articles. The authors concluded that "the evidence base for noninvasive direct coronary imaging technologies is currently inadequate for routine use in the diagnosis and management of CAD.

Pulmonary Embolism
Studies support diagnostic tools other than MRA for evaluating possible pulmonary embolism, such as D-dimer, pulmonary ventilation/perfusion (V/Q) scan, and CTA. In pregnant women, V/Q scans are recommended by many as the first imaging test following D-dimer. Pulmonary MRA may be considered as an alternative to CTA when iodine contrast injection or radiation is a patient-specific significant matter (Stein, et al., 2006; Pleszewski, et al., 2006).

Professional Societies/Organizations (Cardiac MRA)

American College of Cardiology/American Heart Association (ACC/AHA): The ACC/AHA 2008 Guidelines for the Management of Adults With Congenital Heart Disease (Warnes, et al., 2008) included these recommendations specific to MRA:

- Right Ventricular Outflow Tract Obstruction: Recommendations for Evaluation of Patients With Supravalvular, Branch, and Peripheral Pulmonary Stenosis: Patients with suspected supravalvular, branch, or peripheral pulmonary stenosis should have baseline imaging with echocardiography-Doppler plus 1 of the following: MRA, CTA, or contrast angiography (Class I)
- Left-Sided Heart Obstructive Lesions: Aortic Valve Disease, Subvalvular and Supravalvular Aortic Stenosis, Associated Disorders of the Ascending Aorta, and Coarctation: Recommendations for Evaluation of the Unoperated Patient: MRA may be beneficial in quantifying aortic regurgitation when other data are ambiguous or borderline (Class IIb)
- Coronary Artery Abnormalities Recommendations for Congenital Coronary Anomalies of Ectopic Arterial Origin: CT or MRA is useful as the initial screening method in centers with expertise in such imaging. (Class I)

See Appendix B for ACC/AHA Definitions of Classification used.

American College of Cardiology Foundation (ACCF)/American College of Radiology (ACR): (Note: See Appendix A for definition of pre-test probability of coronary artery disease)
The ACCF, ACR, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, American Society of Nuclear Cardiology, North American Society for Cardiac Imaging, Society for Cardiovascular Angiography and Interventions, and Society of Interventional Radiology published Appropriateness Criteria for Cardiac Computed Tomography and Cardiac Magnetic Resonance Imaging in October 2006 (Hendel, et al., 2006). MRA indications were rated appropriate, uncertain or inappropriate:

For the detection of CAD, symptomatic, evaluation of chest pain syndrome, MRA is:
- Inappropriate for intermediate pre-test probability of CAD and ECG interpretable and able to exercise
- Inappropriate for intermediate pre-test probability of CAD and ECG uninterpretable or unable to exercise
- Inappropriate for high pre-test probability of CAD

For detection of CAD, symptomatic, evaluation of intra-cardiac structures, MRA is:
- Appropriate for evaluation of suspected coronary anomalies

For detection of CAD, post-revascularization (percutaneous coronary intervention [PCI] or coronary artery bypass graft [CABG]), evaluation of chest pain syndrome, MRA is:

- Inappropriate for evaluation of bypass grafts
- Inappropriate if history of percutaneous revascularization with stents

For structure and function, evaluation of ventricular and valvular function**,** LV/RV mass and volumes, MRA, quantification of valvular disease, and delayed contrast enhancement, MRI/MRA is:

- Appropriate for assessment of complex congenital heart disease including anomalies of coronary circulation, great vessels, and cardiac chambers and valves AND procedures may include LV/RV mass and volumes, MR angiography, quantification of valvular disease, and contrast enhancement
- Uncertain for evaluation of LV function following myocardial infarction OR in heart failure patients
- Appropriate for evaluation of LV function following myocardial infarction OR in heart failure patients and patients with technically limited images from echocardiogram
- Appropriate for quantification of LV function and discordant information that is clinically significant from prior tests
- Appropriate for evaluation of specific cardiomyopathies (infiltrative [amyloid, sarcoid], HCM, or due to cardiotoxic therapies) and use of delayed enhancement
- Appropriate for characterization of native and prosthetic cardiac valves—including planimetry of stenotic disease and quantification of regurgitant disease and patients with technically limited images from echocardiogram or TEE
- Appropriate for evaluation for arrhythmogenic right ventricular cardiomyopathy (ARVC) and patients presenting with syncope or ventricular arrhythmia
- Appropriate for evaluation of myocarditis or myocardial infarction with normal coronary arteries and positive cardiac enzymes without obstructive atherosclerosis on angiography

For structure and function, evaluation of intra- and extra-cardiac structures, LV/RV mass and volumes, MRA, quantification of valvular disease, and delayed contrast enhancement, MRI/MRA is:

- Appropriate for evaluation of cardiac mass (suspected tumor or thrombus) and use of contrast for perfusion and enhancement
- Appropriate for evaluation of pericardial conditions (pericardial mass, constrictive pericarditis)
- Appropriate for evaluation for aortic dissection
- Appropriate for evaluation of pulmonary veins prior to radiofrequency ablation for atrial fibrillation and left atrial and pulmonary venous anatomy including dimensions of veins for mapping purposes

American Heart Association (AHA): The AHA published a Scientific Statement “Noninvasive Coronary Artery Imaging: Magnetic Resonance Angiography and Multidetector Computed Tomography Angiography” (Bluemke, et al., 2008). The AHA states that the chief advantages of coronary CTA compared with MRA are wider availability, higher spatial resolution, and more consistent, shorter examinations with better patient adherence. Advantages associated with coronary MRA are a lack of ionizing radiation and a lack of administration of iodinated contrast material. Both tests are presently suboptimal for patients with atrial fibrillation and other arrhythmias, and image quality may be further reduced by high body mass. The AHA notes that specific recommendations for use of these technologies are expected to change along with advances in scanner hardware and software. At present, the following general statements represent the consensus opinions of the writing group:

1. Neither coronary CTA nor MRA should be used to screen for coronary artery disease in patients who have no signs or symptoms suggestive of coronary artery disease. (Class III)

2. No multivendor trial data are available for coronary MDCT CTA or for present whole-heart coronary MRA. Thus, the applicability of these methods beyond the reporting research centers is unknown. Ideally, both multivendor and additional multicenter validation of these methods should be performed. (Class I)

3. The potential benefit of noninvasive coronary angiography is likely to be greatest and is reasonable for symptomatic patients who are at intermediate risk for coronary artery disease after initial risk stratification, including patients with equivocal stress-test results. (Class IIa)
Diagnostic accuracy favors coronary CTA over MRA for these patients. (Class I)
Concerns regarding radiation dose limit the use of coronary CTA in high-risk patients who have a very low pre-test likelihood of coronary stenoses; patients with a high pre-test likelihood of coronary stenoses are

likely to require intervention and invasive catheter angiography for definitive evaluation; thus, CTA is not recommended for those individuals. (Class III)
Pronounced coronary calcification may negatively impact interpretability and accuracy of coronary CTA and thus, the usefulness of CTA is uncertain in these individuals. (Class IIb)

4. Anomalous coronary artery evaluation can be performed by either CTA or MRA; radiation-protection concerns indicate that MRA is preferred when it is available. (Class IIa)

5. Reporting of coronary CTA and MRA results should describe any limitations to the technical quality of the examination and the size of the vessels, descriptions of coronary anomalies, coronary stenosis, and significant noncardiac findings within the field of view. (Class I)

6. Continued research in cardiac CT and MR imaging is encouraged to determine the potential of these noncatheter- based modalities to detect, characterize, and measure atherosclerotic plaque burden, as well as its change over time or as the result of therapy. (Class I)

See Appendix A for definition of pre-test probability of CAD. See Appendix B for ACC/AHA Definitions of Classification used.

American College of Radiology (ACR): The ACR Practice Guideline for the Performance and Interpretation of Cardiac Magnetic Resonance Imaging (MRI) states “MR angiography using gadolinium-enhanced techniques is frequently used in conjunction with other cardiac MRI methods. MR angiography may provide additional useful information regarding the status of the aorta, pulmonary artery, pulmonary veins, coronary arteries, and vena cava” (2006).

The American College of Radiology Practice Guideline for the Performance of Pediatric and Adult Cerebrovascular MRA (2006) notes that MRA is particularly applicable in children due to the risk (albeit low) related to angiographic procedures. Indications for cerebrovascular MRA for children include, but are not limited to, the definition and evaluation of the following:

- arterial dissection
- dural sinus thrombosis
- cerebral arteriovenous malformations
- vascular status following extracorporeal membrane oxygenation
- intracranial aneurysm
- vascular abnormalities associated with sickle cell anemia
- blood supply to vascular neoplasms for operative planning
- etiology of intracranial hemorrhage and spinal hemorrhage
- presence, nature, and extent of injury to cervicocerebral vessels, including dissection
- presence of intracranial venous occlusive disease and spinal venous drainage
- nature and extent of other congenital or acquired vascular abnormality

Indications for cerebrovascular MRA of adults include, but are not limited to, the definition and evaluation of the following:

- presence and extent of atherosclerotic occlusive disease and thromboembolic phenomena
- etiology of intracranial hemorrhage and spinal hemorrhage
- relevant vascular anatomy for determining the effect of therapeutic measures including post-treatment evaluation of endovascular treatment of aneurysm and arteriovenous malformation (AVM) ablation
- presence, location, and anatomy of extracranial and intracranial aneurysms and vascular malformations
- presence, nature, and extent of injury to cervicocerebral vessels, including dissection
- vascular supply to tumors
- presence of intracranial venous occlusive disease and spinal venous drainage
- nature and extent of other congenital or acquired vascular abnormality

American College of Radiology Practice Guideline for the performance of Pediatric and Adult Body MRA (2006) adult indications for body MRA include, but are not limited to, the definition and evaluation of the following:

- presence and extent of atherosclerotic occlusive disease and thromboembolic phenomena
- etiology of visceral, thoracic, abdominal, or pelvic hemorrhage
- relevant vascular anatomy for determining the effect of therapeutic measures, including post-treatment evaluation of endovascular treatment of aneurysm, stenosis, and arteriovenous malformation (AVM) ablation
- presence, location, and anatomy of aneurysms and vascular malformations
- presence, nature, and extent of injury to vessels, including dissection
- vascular supply to tumors
- presence of venous disease
- nature and extent of other congenital or acquired vascular abnormality

Pediatric indications for body MRA include, but are not limited to, the definition and evaluation of the following:

- arterial dissection
- congenital anomalies of the aorta and associated branch vessels
- vascular malformations of the trunk and extremity
- vasculities
- aneurysmal disease
- vascular abnormalities associated with sickle cell anemia
- blood supply to vascular neoplasms for operative planning
- vascular anastomoses and complications of organ transplants
- presence of visceral venous occlusive disease
- postoperative anatomy following vascular surgery

Summary
Magnetic resonance angiography (MRA) is an effective imaging tool for imaging of vessels of the head, neck, heart, thorax, abdomen and extremities and may be useful in some population subsets for the screening and surveillance of intracranial aneurysms. MRA is an effective alternative diagnostic tool when there is a specific contraindication for the patient to receive iodinated contrast material (i.e., patient has allergy to iodinated contrast material, renal insufficiency, or has a medical condition that precludes exposure to additional large doses of ionizing radiation). The clinical utility of MRA for coronary artery disease screening has not been not established.

Coding/Billing Information

Note: This list of codes may not be all-inclusive.

Covered when medically necessary:

CPT®* Codes	Description
70544	Magnetic resonance angiography, head; without contrast material(s)
70545	Magnetic resonance angiography, head; with contrast material(s)
70546†	Magnetic resonance angiography, head; without contrast material(s), followed by contrast material(s) and further sequences
70547	Magnetic resonance angiography, neck; without contrast material(s)
70548	Magnetic resonance angiography, neck; with contrast material(s)
70549†	Magnetic resonance angiography, neck; without contrast material(s), followed by contrast material(s) and further sequences
71555	Magnetic resonance angiography, chest (excluding myocardium), with or without contrast material(s)
72159	Magnetic resonance angiography, spinal canal and contents, with or without contrast material(s)
72198	Magnetic resonance angiography, pelvis, with or without contrast material(s)
73225	Magnetic resonance angiography, upper extremity, with or without contrast material(s)

73725	Magnetic resonance angiography, lower extremity, with or without contrast material(s)
74185	Magnetic resonance angiography, abdomen, with or without contrast material(s)

[†]Note: Covered as medically necessary when suspected or known intracranial, vertebral or basilar dissection or for follow-up of berry aneurysm.

HCPCS Codes	Description
C8900	Magnetic resonance angiography with contrast, abdomen
C8901	Magnetic resonance angiography without contrast, abdomen
C8902	Magnetic resonance angiography without contrast followed by with contrast, abdomen
C8909	Magnetic resonance angiography with contrast, chest (excluding myocardium)
C8910	Magnetic resonance angiography without contrast, chest (excluding myocardium)
C8911	Magnetic resonance angiography without contrast followed by with contrast, chest (excluding myocardium)
C8912	Magnetic resonance angiography with contrast, lower extremity
C8913	Magnetic resonance angiography without contrast, lower extremity
C8914	Magnetic resonance angiography without contrast followed by with contrast, lower extremity
C8918	Magnetic resonance angiography with contrast, pelvis
C8919	Magnetic resonance angiography without contrast, pelvis
C8920	Magnetic resonance angiography without contrast followed by with contrast, pelvis

ICD-9-CM Diagnosis Codes	Description
282.60	Sickle-cell disease, unspecified
353.0	Nerve root and plexus disorders; Brachial plexus lesions
415.11	Iatrogenic pulmonary embolism and infarction
415.19	Pulmonary embolism and infarction; Other
430	Subarachnoid hemorrhage
437.0	Cerebral atherosclerosis
437.1	Other generalized ischemic cerebrovascular disease
437.2	Hypertensive encephalopathy
437.3	Cerebral aneurysm, nonruptured
440.21	Atherosclerosis of native arteries of the extremities with intermittent claudication
441.00	Dissection of aorta; Unspecified site
441.01	Dissection of aorta; Thoracic
441.02	Dissection of aorta; Abdominal
441.03	Dissetion of aorta; Thoracoabdominal
441.1	Thoracic aneurysm, ruptured
441.2	Thoracic aneurysm without mention of rupture
441.3	Abdominal aneurysm, ruptured
441.4	Abdominal aneurysm without mention of rupture
441.5	Aortic aneurysm of unspecified site, ruptured
441.6	Thoracoabdominal aneurysm, ruptured
441.7	Thoracoabdominal aneurysm, without mention of rupture
441. 9	Aortic aneurysm of unspecified site without mention of rupture
443.81	Peripheral angiopathy in diseases classified elsewhere
443.89	Other peripheral vascular disease
446.1	Acute febrile mucocutaneous lymph node syndrome [MCLS]
446.7	Takayasu's disease

756.83	Ehlers-Danlos syndrome
759.82	Marfan syndrome
	Multiple/varied

Experimental/Investigational/Unproven/Not Covered:

ICD-9-CM Diagnosis Codes	Description
V81.0	Screening for ischemic heart disease
V81.2	Screening for other and unspecified cardiovascular conditions
	All other codes

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APPENDIX A

From the American College of Cardiology (Hendel, et al., 2009):

Pre-Test Probability of CAD by Age, Gender, and Symptoms*

Age (Yrs)	Gender	Typical/Definite Angina Pectoris	Atypical/Probable Angina Pectoris	Nonanginal Chest Pain	Asymptomatic
<39	M F	Intermediate Intermediate	Intermediate Very low	Low Very low	Very low Very low

40-49	M F	High Intermediate	Intermediate Low	Intermediate Very low	Low Very low
50-59	M F	High Intermediate	Intermediate Intermediate	Intermediate Low	Low Very low
>60	M F	High High	Intermediate Intermediate	Intermediate Intermediate	Low Low

High: Greater than 90% pre-test probability; Intermediate: Between 10% and 90% pre-test probability; Low: Between 5% and 10% pre-test probability; Very Low: Less than 5% pre-test probability.
*Modified from the ACC/AHA Exercise Testing Guidelines to reflect all age ranges (Gibbons, et al., 2002).

APPENDIX B

American College of Cardiology/American Heart Association (ACC/AHA) Definitions of Classification used:

Class I: Conditions for which there is evidence for and/or general agreement that the procedure or treatment is beneficial, useful, and effective.

Class II: Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/ efficacy of a procedure or treatment.

Class IIa: Weight of evidence/opinion is in favor of usefulness/efficacy.

Class IIb: Usefulness/efficacy is less well established by evidence/opinion.

Class III: Conditions for which there is evidence and/or general agreement that the procedure/treatment is not useful/effective and in some cases may be harmful.

Policy History

Pre-Merger Organizations	Last Review Date	Policy Number	Title
CIGNA HealthCare	9/15/2008	0154	Magnetic Resonance Angiography (MRA)

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Connecticut General Life Insurance Company has acquired the business of Great-West Healthcare from Great-West Life & Annuity Insurance Company (GWLA). Certain products continue to be provided by GWLA (Life, Accident and Disability, and Excess Loss). GWLA is not licensed to do business in New York. In New York, these products are sold by GWLA's subsidiary, First Great-West Life & Annuity Insurance Company, White Plains, N.Y.